How To Improve the Water Quality of the Susquehanna River and Help Save the Chesapeake Bay

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Chesapeake Bay in Trouble

Dramatic reductions of oyster, crab, and shad populations are evidence of alarming decline in sport and commercial fishing in Chesapeake Bay. These reductions of estuarine populations have been linked to anoxic water, insufficient concentrations of dissolved oxygen, a condition which is spreading due to increasing concentrations of nutrients, especially nitrogen and phosphorus.

The situation is further aggravated by high levels of suspended sediment. The Susquehanna River provides the Chesapeake with half of the Bay's fresh water. Unfortunately, it also is responsible for contributing 40% of the nitrogen and 20% of the phosphorus. Therefore, any action to "clean up the Bay" must include the Susquehanna River drainage area.

The head waters of the Susquehanna River are concentrated in south-central New York State and eastern Pennsylvania. More than seventeen million acres lie within this drainage basin, the bulk of which is rural, with agriculture and forest land being the dominant land uses. The most promising opportunity to improve water quality, both to the benefit of the people of the two States and, ultimately, the Chesapeake Bay, is to plant trees on a portion of agricultural land, especially the low productive sites prone to erode if left unprotected. Forest plantations

Figure 1—Steep slopes are highly prone to erosion. Fast running water during heavy rains will eventually cut gullies and carry off the top soil. Livestock grazing aggravates the situation.

can stop erosion, restore the land, and in the long run, contribute to the economic well being of the area.

At one time, the entire eastern United States was covered by verdant forests. But as the region was settled, forests were cleared for farms and villages. Gradually, the nation grew, industries and manufacturing developed, and villages expanded into cities. The Chesapeake Bay has been on the receiving end of increasingly polluted water for more than 300 years, and has lost the ability to cleanse itself. Industrial discharge and sewage, point sources, have been the targets of pollution abatement for 20 years and some progress has been made. Pollution from land-use activities, non-point sources, is less readily apparent and, therefore, is more difficult to correct.

Forest cover provides the best protection against run-off and erosion through multiple watershed benefits.

a. Raindrops falling on exposed soil dislodge fine soil particles, thereby initiating erosion. Tree crowns intercept raindrops and reduce the speed at which they fall, lessening the impact on the ground.

Figure 2—A major source of sedimentation of streams and rivers that can be corrected by planting trees.

b. Forest litter, such as leaves and twigs, decompose and build a layer of humus, known as duff. This nutrient-rich layer acts like a sponge over mineral soil and permits water to percolate slowly into the soil.
c. Forest soils are very effectively held in place by the fine root network of trees and associated forest cover.

To capitalize on the healing qualities of trees to the landscape and to eliminate sedimentation of streams and rivers within the Susquehanna River basin drainage area, trees should be planted where possible on: (a) steep agricultural land that is only marginally productive (Fig. 1), (b) moderately steep fields on particularly erosive soils (Fig. 2), and (c) areas adjacent to streams to serve as filter strips (Fig. 3).

Cropland conversion to forests would stop overfertilization of those sites where a heavy application of fertilizer has been used to compensate for site degradation caused by erosion. Withholding these excess nutrients from the soil would keep them out of the streams. Planted areas adjacent to streams serve as filters to trap sediment and reduce run-off containing dissolved fertilizers and pesticides. They also stabilize stream banks and decrease water

Figure 3—A planted buffer strip between the field and stream can reduce soil erosion, sedimentation, and nutrient load into the stream.

temperature by shade, which favor certain fish species (fig. 4).

In addition to agriculture, forest activities, primarily logging, can contribute to sedimentation, non-point source pollution of waterways. Erosion is linked directly to the exposure of bare mineral soil to the weather. Where there is no bare mineral soil, there is no erosion. Studies have shown that 90% of the erosion attributable to logging comes from logging roads, skid trails and landings. Therefore, control of erosion from logging requires locating roads properly, providing buffer strips near streams, constructing good drainage, and stabilizing these structures when the job is finished (Fig. 5).

Through the combined effects of improved agricultural and forestry practices, the level of non-point source pollution can be reduced. Technical assistance is available from county, State and Federal agencies. Agencies cooperating in this project include: USDA Agricultural Stabilization and Conservation Service, USDA Forest Service, USDA Soil Conservation Service, US Environmental Protection Agency, New York State Dept. of Environmental Conservation, Pennsylvania Dept. of Environmental Resources, Maryland Dept. of Natural Resources, the

Figure 4—A 50′ buffer strip of trees along this stream will help stabilize the streambank, and lower the water temperature to maintain adequate fish habitat.

respective State Water Quality agencies, the Cooperative Extension Services and the Soil and Water Conservation Districts of all three states.

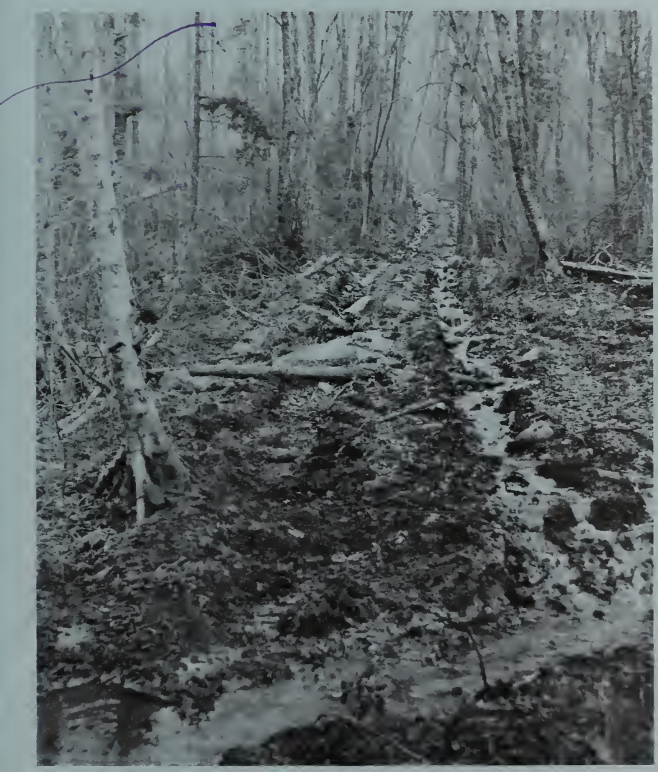

Figure 5—An improperly installed skid trail with no drainage ditches. Water will continue to erode down to bedrock, if not properly drained and stabilized.